

# SEQUENCE LISTING

<110> Novartis AG et al.

<120> GENES INVOLVED IN NEURODEGENERATIVE DISORDERS

<130> PN/4-33424A/USN

<140> PCT/EP2004/011926

<141> 2004-10-21

<150> US60/513241

<151> 2003-10-22

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<170> PatentIn version 3.2

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Leu Asp Tyr Leu Leu Ser Leu Gly Gln Ile Ser Arg Arg Asp Ala Leu  
100 105 110

Glu Val Thr Trp Tyr His Ala Ala Asn Ser Lys Lys Ala Met Thr Ala  
115 120 125

Ala Leu Asn Ser Asn Ile Thr Val Leu Glu Ala Asp Val Asn Val Glu  
130 135 140

Gly Leu Gly Thr Ala Asn Glu Thr Gly Val Pro Ile Met Ala His Pro  
145 150 155 160

Pro Thr Ile Tyr Ser Asp Asn Thr Leu Glu Gln Trp Leu Asp Ala Val  
165 170 175

Leu Gly Ser Ser Gln Lys Gly Ile Lys Leu Asp Phe Lys Asn Ile Lys  
180 185 190

Ala Val Gly Pro Ser Leu Asp Leu Leu Arg Gln Leu Thr Glu Glu Gly  
195 200 205

Lys Val Arg Arg Pro Ile Trp Ile Asn Ala Asp Ile Leu Lys Gly Pro  
210 215 220

Asn Met Leu Ile Ser Thr Glu Val Asn Ala Thr Gln Phe Leu Ala Leu  
225 230 235 240

Val Gln Glu Lys Tyr Pro Lys Ala Thr Leu Ser Pro Gly Trp Thr Thr  
245 250 255

Phe Tyr Met Ser Thr Ser Pro Asn Arg Thr Tyr Thr Gln Ala Met Val  
260 265 270

Glu Lys Met His Glu Leu Val Gly Gly Val Pro Gln Arg Val Thr Phe  
275 280 285

Pro Val Arg Ser Ser Met Val Arg Ala Ala Trp Pro His Phe Ser Trp  
290 295 300

Leu Leu Ser Gln Ser Glu Arg Tyr Ser Leu Thr Leu Trp Gln Ala Ala  
305 310 315 320

Ser Asp Pro Met Ser Val Glu Asp Leu Leu Tyr Val Arg Asp Asn Thr  
325 330 335

Ala Val His Gln Val Tyr Tyr Asp Ile Phe Glu Pro Leu Leu Ser Gln  
340 345 350

Phe Lys Gln Leu Ala Leu Asn Ala Thr Arg Lys Pro Met Tyr Tyr Thr  
355 360 365

Gly Gly Ser Leu Ile Pro Leu Leu Gln Leu Pro Gly Asp Asp Gly Leu  
370 375 380

Asn Val Glu Trp Leu Val Pro Asp Val Gln Gly Ser Gly Lys Thr Ala  
385 390 395 400

Thr Met Thr Leu Pro Asp Thr Glu Gly Met Ile Leu Leu Asn Thr Gly  
405 410 415

Leu Glu Gly Thr Val Ala Glu Asn Pro Val Pro Ile Val His Thr Pro  
420 425 430

Ser Gly Asn Ile Leu Thr Leu Glu Ser Cys Leu Gln Gln Leu Ala Thr  
435 440 445

His Pro Gly His Trp Gly Ile His Leu Gln Ile Val Glu Pro Ala Ala  
450 455 460

Leu Arg Pro Ser Leu Ala Leu Leu Ala Arg Leu Ser Ser Leu Gly Leu  
465 470 475 480

Leu His Trp Pro Val Trp Val Gly Ala Lys Ile Ser His Gly Ser Phe  
485 490 495

Ser Val Pro Gly His Val Ala Gly Arg Glu Leu Leu Thr Ala Val Ala  
500 505 510

Glu Val Phe Pro His Val Thr Val Ala Pro Gly Trp Pro Glu Glu Val  
 515 520 525

Leu Gly Ser Gly Tyr Arg Glu Gln Leu Leu Thr Asp Met Leu Glu Leu  
 530 535 540

Cys Gln Gly Leu Trp Gln Pro Val Ser Phe Gln Met Gln Ala Met Leu  
 545 550 555 560

Leu Gly His Ser Thr Ala Gly Ala Ile Gly Arg Leu Leu Ala Ser Ser  
 565 570 575

Pro Arg Ala Thr Val Thr Val Glu His Asn Pro Ala Gly Gly Asp Tyr  
 580 585 590

Ala Ser Val Arg Thr Ala Leu Leu Ala Ala Arg Ala Val Asp Arg Thr  
 595 600 605

Arg Val Tyr Tyr Arg Leu Pro Gln Gly Tyr His Lys Asp Leu Leu Ala  
 610 615 620

His Val Gly Arg Asn  
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 <211> 3037  
 <212> DNA  
 <213> Homo sapiens

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<210> 8  
<211> 545  
<212> PRT  
<213> Homo sapiens

<400> 8

Met Leu Pro Gly Ala Trp Leu Leu Trp Thr Ser Leu Leu Leu Leu Ala  
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Arg Pro Ala Gln Pro Cys Pro Met Gly Cys Asp Cys Phe Val Gln Glu  
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Val Phe Cys Ser Asp Glu Glu Leu Ala Thr Val Pro Leu Asp Ile Pro  
35 40 45

Pro Tyr Thr Lys Asn Ile Ile Phe Val Glu Thr Ser Phe Thr Thr Leu  
50 55 60

Glu Thr Arg Ala Phe Gly Ser Asn Pro Asn Leu Thr Lys Val Val Phe  
65 70 75 80

Leu Asn Thr Gln Leu Cys Gln Phe Arg Pro Asp Ala Phe Gly Gly Leu  
85 90 95



Pro Arg Leu Glu Asp Leu Glu Val Thr Gly Ser Ser Phe Leu Asn Leu  
100 105 110

Ser Thr Asn Ile Phe Ser Asn Leu Thr Ser Leu Gly Lys Leu Thr Leu  
115 120 125

Asn Phe Asn Met Leu Glu Ala Leu Pro Glu Gly Leu Phe Gln His Leu  
130 135 140

Ala Ala Leu Glu Ser Leu His Leu Gln Gly Asn Gln Leu Gln Ala Leu  
145 150 155 160

Pro Arg Arg Leu Phe Gln Pro Leu Thr His Leu Lys Thr Leu Asn Leu  
165 170 175

Ala Gln Asn Leu Leu Ala Gln Leu Pro Glu Glu Leu Phe His Pro Leu  
180 185 190

Thr Ser Leu Gln Thr Leu Lys Leu Ser Asn Asn Ala Leu Ser Gly Leu  
195 200 205

Pro Gln Gly Val Phe Gly Lys Leu Gly Ser Leu Gln Glu Leu Phe Leu  
210 215 220

Asp Ser Asn Asn Ile Ser Glu Leu Pro Pro Gln Val Phe Ser Gln Leu  
225 230 235 240

Phe Cys Leu Glu Arg Leu Trp Leu Gln Arg Asn Ala Ile Thr His Leu  
245 250 255

Pro Leu Ser Ile Phe Ala Ser Leu Gly Asn Leu Thr Phe Leu Ser Leu  
260 265 270

Gln Trp Asn Met Leu Arg Val Leu Pro Ala Gly Leu Phe Ala His Thr  
275 280 285

Pro Cys Leu Val Gly Leu Ser Leu Thr His Asn Gln Leu Glu Thr Val  
290 295 300

Ala Glu Gly Thr Phe Ala His Leu Ser Asn Leu Arg Ser Leu Met Leu  
305 310 315 320

Ser Tyr Asn Ala Ile Thr His Leu Pro Ala Gly Ile Phe Arg Asp Leu  
325 330 335

Glu Glu Leu Val Lys Leu Tyr Leu Gly Ser Asn Asn Leu Thr Ala Leu  
340 345 350

His Pro Ala Leu Phe Gln Asn Leu Ser Lys Leu Glu Leu Leu Ser Leu  
355 360 365

Ser Lys Asn Gln Leu Thr Thr Leu Pro Glu Gly Ile Phe Asp Thr Asn  
370 375 380

Tyr Asn Leu Phe Asn Leu Ala Leu His Gly Asn Pro Trp Gln Cys Asp  
385 390 395 400

Cys His Leu Ala Tyr Leu Phe Asn Trp Leu Gln Gln Tyr Thr Asp Arg  
405 410 415

Leu Leu Asn Ile Gln Thr Tyr Cys Ala Gly Pro Ala Tyr Leu Lys Gly  
420 425 430

Gln Val Val Pro Ala Leu Asn Glu Lys Gln Leu Val Cys Pro Val Thr  
435 440 445

Arg Asp His Leu Gly Phe Gln Val Thr Trp Pro Asp Glu Ser Lys Ala  
450 455 460

Gly Gly Ser Trp Asp Leu Ala Val Gln Glu Arg Ala Ala Arg Ser Gln  
465 470 475 480

Cys Thr Tyr Ser Asn Pro Glu Gly Thr Val Val Leu Ala Cys Asp Gln  
485 490 495

Ala Gln Cys Arg Trp Leu Asn Val Gln Leu Ser Pro Arg Gln Gly Ser  
500 505 510

Leu Gly Leu Gln Tyr Asn Ala Ser Gln Glu Trp Asp Leu Arg Ser Ser  
515 520 525

Cys Gly Ser Leu Arg Leu Thr Val Ser Ile Glu Ala Arg Ala Ala Gly  
530 535 540

Pro

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 <211> 1846  
 <212> DNA  
 <213> Homo sapiens

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 ttgaatataa ataattactt taaaattgta atgacacttt tacacgtaag tgttttgttc 1800  
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 <211> 414  
 <212> PRT  
 <213> Homo sapiens

<400> 10

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Gly Ala Ala Leu Pro Leu Arg Pro Arg Pro Pro Leu Pro Ala Ser Pro  
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Ala Arg Pro Leu Leu Pro Ala Ala Arg Gln Ser Gln Ala Pro Ala Leu  
 35 40 45

Gly Arg Pro Arg Ala Arg Arg Pro Gly Thr Ser Val Ala Ala His Ala  
 50 55 60

Asp Arg Cys Pro Pro Pro Pro Gln Ala Ala Leu Ala Ala Ala Leu  
 65 70 75 80

Gly Pro Ala Glu Ala Gly Met Leu Glu Lys Leu Glu Phe Glu Asp Glu  
 85 90 95

Ala Val Glu Asp Ser Glu Ser Gly Val Tyr Met Arg Phe Met Arg Ser  
 100 105 110

His Lys Cys Tyr Asp Ile Val Pro Thr Ser Ser Lys Leu Val Val Phe  
 115 120 125

Asp Thr Thr Leu Gln Val Lys Lys Ala Phe Phe Ala Leu Val Ala Asn  
 130 135 140

Gly Val Arg Ala Ala Pro Leu Trp Glu Ser Lys Lys Gln Ser Phe Val  
145 150 155 160

Gly Met Leu Thr Ile Thr Asp Phe Ile Asn Ile Leu His Arg Tyr Tyr  
165 170 175

Lys Ser Pro Met Val Gln Ile Tyr Glu Leu Glu Glu His Lys Ile Glu  
180 185 190

Thr Trp Arg Glu Leu Tyr Leu Gln Glu Thr Phe Lys Pro Leu Val Asn  
195 200 205

Ile Ser Pro Asp Ala Ser Leu Phe Asp Ala Val Tyr Ser Leu Ile Lys  
210 215 220

Asn Lys Ile His Arg Leu Pro Val Ile Asp Pro Ile Ser Gly Asn Ala  
225 230 235 240

Leu Tyr Ile Leu Thr His Lys Arg Ile Leu Lys Phe Leu Gln Leu Phe  
245 250 255

Met Ser Asp Met Pro Lys Pro Ala Phe Met Lys Gln Asn Leu Asp Glu  
260 265 270

Leu Gly Ile Gly Thr Tyr His Asn Ile Ala Phe Ile His Pro Asp Thr  
275 280 285

Pro Ile Ile Lys Ala Leu Asn Ile Phe Val Glu Arg Arg Ile Ser Ala  
290 295 300

Leu Pro Val Val Asp Glu Ser Gly Lys Val Val Asp Ile Tyr Ser Lys  
305 310 315 320

Phe Asp Val Ile Asn Leu Ala Ala Glu Lys Thr Tyr Asn Asn Leu Asp  
325 330 335

Ile Thr Val Thr Gln Ala Leu Gln His Arg Ser Gln Tyr Phe Glu Gly  
340 345 350

Val Val Lys Cys Asn Lys Leu Glu Ile Leu Glu Thr Ile Val Asp Arg  
355 360 365

Ile Val Arg Ala Glu Val His Arg Leu Val Val Val Asn Glu Ala Asp  
 370 375 380

Ser Ile Val Gly Ile Ile Ser Leu Ser Asp Ile Leu Gln Ala Leu Ile  
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Leu Thr Pro Ala Gly Ala Lys Gln Lys Glu Thr Glu Thr Glu  
 405 410

<210> 11  
 <211> 2813  
 <212> DNA  
 <213> Homo sapiens

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<212> PRT  
<213> Homo sapiens

<400> 12

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Gln Ser Leu Glu Ile His Pro Leu Gly Pro Ala His Pro Asn Ser Asn  
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Pro Leu Gly Pro Ser Leu Gln Gly Pro Asp Cys Gly Arg Gln Pro Leu  
35 40 45

Leu Ser Glu Gln Arg Phe Leu Arg Gly Ala Leu Pro Ser Arg Ala Leu  
50 55 60

Leu Met Gly Lys Ser Glu Gly Pro Val Gly Met Val Glu Ser Ala Gly  
65 70 75 80

Arg Ala Gly Gln Lys Arg Pro Gly Phe Leu Glu Gly Gly Leu Leu Leu  
85 90 95

Leu Leu Leu Leu Val Thr Ala Ala Leu Val Ala Leu Gly Val Leu Tyr  
100 105 110

Ala Asp Arg Arg Gly Ile Pro Glu Ala Gln Glu Val Ser Glu Val Cys  
115 120 125

Thr Thr Pro Gly Cys Val Ile Ala Ala Ala Arg Ile Leu Gln Asn Met  
130 135 140

Asp Pro Thr Thr Glu Pro Cys Asp Asp Phe Tyr Gln Phe Ala Cys Gly  
145 150 155 160

Gly Trp Leu Arg Arg His Val Ile Pro Glu Thr Asn Ser Arg Tyr Ser  
165 170 175

Ile Phe Asp Val Leu Arg Asp Glu Leu Glu Val Ile Leu Lys Ala Val  
180 185 190

Leu Glu Asn Ser Thr Ala Lys Asp Arg Pro Ala Val Glu Lys Ala Arg  
195 200 205



Thr Leu Tyr Arg Ser Cys Met Asn Gln Ser Val Ile Glu Lys Arg Gly  
210 215 220

Ser Gln Pro Leu Leu Asp Ile Leu Glu Val Val Gly Gly Trp Pro Val  
225 230 235 240

Ala Met Asp Arg Trp Asn Glu Thr Val Gly Leu Glu Trp Glu Leu Glu  
245 250 255

Arg Gln Leu Ala Leu Met Asn Ser Gln Phe Asn Arg Arg Val Leu Ile  
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Asp Leu Phe Ile Trp Asn Asp Asp Gln Asn Ser Ser Arg His Ile Ile  
275 280 285

Tyr Ile Asp Gln Pro Thr Leu Gly Met Pro Ser Arg Glu Tyr Tyr Phe  
290 295 300

Asn Gly Gly Ser Asn Arg Lys Val Arg Glu Ala Tyr Leu Gln Phe Met  
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Val Ser Val Ala Thr Leu Leu Arg Glu Asp Ala Asn Leu Pro Arg Asp  
325 330 335

Ser Cys Leu Val Gln Glu Asp Met Val Gln Val Leu Glu Leu Glu Thr  
340 345 350

Gln Leu Ala Lys Ala Thr Val Pro Gln Glu Glu Arg His Asp Val Ile  
355 360 365

Ala Leu Tyr His Arg Met Gly Leu Glu Glu Leu Gln Ser Gln Phe Gly  
370 375 380

Leu Lys Gly Phe Asn Trp Thr Leu Phe Ile Gln Thr Val Leu Ser Ser  
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Val Lys Ile Lys Leu Leu Pro Asp Glu Glu Val Val Val Tyr Gly Ile  
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Pro Tyr Leu Gln Asn Leu Glu Asn Ile Ile Asp Thr Tyr Ser Ala Arg  
420 425 430

Thr Ile Gln Asn Tyr Leu Val Trp Arg Leu Val Leu Asp Arg Ile Gly  
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Ser Leu Ser Gln Arg Phe Lys Asp Thr Arg Val Asn Tyr Arg Lys Ala  
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Leu Phe Gly Thr Met Val Glu Glu Val Arg Trp Arg Glu Cys Val Gly  
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Tyr Val Asn Ser Asn Met Glu Asn Ala Val Gly Ser Leu Tyr Val Arg  
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Glu Ala Phe Pro Gly Asp Ser Lys Ser Met Val Arg Glu Leu Ile Asp  
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Lys Val Arg Thr Val Phe Val Glu Thr Leu Asp Glu Leu Gly Trp Met  
515 520 525

Asp Glu Glu Ser Lys Lys Lys Ala Gln Glu Lys Ala Met Ser Ile Arg  
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Glu Gln Ile Gly His Pro Asp Tyr Ile Leu Glu Glu Met Asn Arg Arg  
545 550 555 560

Leu Asp Glu Glu Tyr Ser Asn Leu Asn Phe Ser Glu Asp Leu Tyr Phe  
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Glu Asn Ser Leu Gln Asn Leu Lys Val Gly Ala Gln Arg Ser Leu Arg  
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Lys Leu Arg Glu Lys Val Asp Pro Asn Leu Trp Ile Ile Gly Ala Ala  
595 600 605

Val Val Asn Ala Phe Tyr Ser Pro Asn Arg Asn Gln Ile Val Phe Pro  
610 615 620

Ala Gly Ile Leu Gln Pro Pro Phe Phe Ser Lys Glu Gln Pro Gln Ala  
625 630 635 640

Leu Asn Phe Gly Gly Ile Gly Met Val Ile Gly His Glu Ile Thr His  
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Gly Phe Asp Asp Asn Gly Arg Asn Phe Asp Lys Asn Gly Asn Met Met

660

665

670

Asp Trp Trp Ser Asn Phe Ser Thr Gln His Phe Arg Glu Gln Ser Glu  
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Cys Met Ile Tyr Gln Tyr Gly Asn Tyr Ser Trp Asp Leu Ala Asp Glu  
690 695 700

Gln Asn Val Asn Gly Phe Asn Thr Leu Gly Glu Asn Ile Ala Asp Asn  
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Gly Gly Val Arg Gln Ala Tyr Lys Ala Tyr Leu Lys Trp Met Ala Glu  
725 730 735

Gly Gly Lys Asp Gln Gln Leu Pro Gly Leu Asp Leu Thr His Glu Gln  
740 745 750

Leu Phe Phe Ile Asn Tyr Ala Gln Val Trp Cys Gly Ser Tyr Arg Pro  
755 760 765

Glu Phe Ala Ile Gln Ser Ile Lys Thr Asp Val His Ser Pro Leu Lys  
770 775 780

Tyr Arg Val Leu Gly Ser Leu Gln Asn Leu Ala Ala Phe Ala Asp Thr  
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Val Trp

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<212> DNA  
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3662

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<211> 795  
<212> PRT  
<213> Homo sapiens

<400> 14

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Arg Pro Ser Arg Trp Leu Ile Gln Val Ala Phe Ala Ala Leu Leu Arg  
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Pro Asn Gln Ser Ala Gly His Leu Ala Ala Gln Leu Thr Pro Arg Pro  
50 55 60

Arg Ser Gln Ala Pro Gly Phe Leu Lys Cys Phe Leu Gly Ala Leu Lys  
65 70 75 80

Met Glu Met Thr Glu Met Thr Gly Val Ser Leu Lys Arg Gly Ala Leu  
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Val Val Glu Asp Asn Asp Ser Gly Val Pro Val Glu Glu Thr Lys Lys  
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Gln Lys Leu Ser Glu Cys Ser Leu Thr Lys Gly Gln Asp Gly Leu Gln  
115 120 125

Asn Asp Phe Leu Ser Ile Ser Glu Asp Val Pro Arg Pro Pro Asp Thr  
130 135 140

Val Ser Thr Gly Lys Gly Gly Lys Asn Ser Glu Ala Gln Leu Glu Asp  
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Glu Glu Glu Glu Glu Glu Asp Gly Leu Ser Glu Glu Cys Glu Glu Glu  
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Glu Ser Glu Ser Phe Ala Asp Met Met Lys His Gly Leu Thr Glu Ala  
180 185 190

Asp Val Gly Ile Thr Lys Phe Val Ser Ser His Gln Gly Phe Ser Gly  
195 200 205

Ile Leu Lys Glu Arg Tyr Ser Asp Phe Val Val His Glu Ile Gly Lys  
210 215 220

Asp Gly Arg Ile Ser His Leu Asn Asp Leu Ser Ile Pro Val Asp Glu  
225 230 235 240

Glu Asp Pro Ser Glu Asp Ile Phe Thr Val Leu Thr Ala Glu Glu Lys  
245 250 255

Gln Arg Leu Glu Glu Leu Gln Leu Phe Lys Asn Lys Glu Thr Ser Val  
260 265 270

Ala Ile Glu Val Ile Glu Asp Thr Lys Glu Lys Arg Thr Ile Ile His  
275 280 285

Gln Ala Ile Lys Ser Leu Phe Pro Gly Leu Glu Thr Lys Thr Glu Asp  
290 295 300

Arg Glu Gly Lys Lys Tyr Ile Val Ala Tyr His Ala Ala Gly Lys Lys  
305 310 315 320

Ala Leu Ala Ser Glu Val Ser Val Ser Ser Phe Leu Leu Pro Gly Ser  
325 330 335

Arg Glu Arg Gln Ala Pro Leu Leu Val Gln Pro Cys Pro Phe Val Phe  
340 345 350

Lys Gly Tyr Tyr Ser Ala Ala Gln Arg Thr Ile Leu Ile Met Ser Leu  
355 360 365

Leu Gln Arg Gly Gly Gln Asn Cys Gln Asp Pro Arg Lys His Ser Trp  
370 375 380

Pro Lys Ser Arg Gly Ser Tyr Cys His Phe Val Leu Tyr Lys Glu Asn  
385 390 395 400

Lys Asp Thr Met Asp Ala Ile Asn Val Leu Ser Lys Tyr Leu Arg Val  
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Lys Pro Asn Ile Phe Ser Tyr Met Gly Thr Lys Asp Lys Arg Ala Ile  
420 425 430

Thr Val Gln Glu Ile Ala Val Leu Lys Ile Thr Ala Gln Arg Leu Ala  
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His Leu Asn Lys Cys Leu Met Asn Phe Lys Leu Gly Asn Phe Ser Tyr  
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Gln Lys Asn Pro Leu Lys Leu Gly Glu Leu Gln Gly Asn His Phe Thr  
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Val Val Leu Arg Asn Ile Thr Gly Thr Asp Asp Gln Val Gln Gln Ala  
485 490 495

Met Asn Ser Leu Lys Glu Ile Gly Phe Ile Asn Tyr Tyr Gly Met Gln  
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Arg Phe Gly Thr Thr Ala Val Pro Thr Tyr Gln Val Gly Arg Ala Ile  
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Leu Gln Asn Ser Trp Thr Glu Val Met Asp Leu Ile Leu Lys Pro Arg  
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Ser Gly Ala Glu Lys Gly Tyr Leu Val Lys Cys Arg Glu Glu Trp Ala  
545 550 555 560

Lys Thr Lys Asp Pro Thr Ala Ala Leu Arg Lys Leu Pro Val Lys Arg  
565 570 575

Cys Val Glu Gly Gln Leu Leu Arg Gly Leu Ser Lys Tyr Gly Met Lys  
580 585 590

Asn Ile Val Ser Ala Phe Gly Ile Ile Pro Arg Asn Asn Arg Leu Met  
595 600 605

Tyr Ile His Ser Tyr Gln Ser Tyr Val Trp Asn Asn Met Val Ser Lys  
610 615 620

Arg Ile Glu Asp Tyr Gly Leu Lys Pro Val Pro Gly Asp Leu Val Leu  
625 630 635 640

Lys Gly Ala Thr Ala Thr Tyr Ile Glu Glu Asp Asp Val Asn Asn Tyr



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Ser Ile His Asp Val Val Met Pro Leu Pro Gly Phe Asp Val Ile Tyr		
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Pro Lys His Lys Ile Gln Glu Ala Tyr Arg Glu Met Leu Thr Ala Asp		
675	680	685
Asn Leu Asp Ile Asp Asn Met Arg His Lys Ile Arg Asp Tyr Ser Leu		
690	695	700
Ser Gly Ala Tyr Arg Lys Ile Ile Ile Arg Pro Gln Asn Val Ser Trp		
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Glu Val Val Ala Tyr Asp Asp Pro Lys Ile Pro Leu Phe Asn Thr Asp		
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Val Asp Asn Leu Glu Gly Lys Thr Pro Pro Val Phe Ala Ser Glu Gly		
740	745	750
Lys Tyr Arg Ala Leu Lys Met Asp Phe Ser Leu Pro Pro Ser Thr Tyr		
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Ala Thr Met Ala Ile Arg Glu Val Leu Lys Met Asp Thr Ser Ile Lys		
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<400> 16

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Arg Leu Leu Met His Gly Lys Glu Val Gly Ser Ile Ile Gly Lys Lys  
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Gly Glu Thr Val Lys Lys Met Arg Glu Glu Ser Gly Ala Arg Ile Asn  
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Ile Ser Glu Gly Asn Cys Pro Glu Arg Ile Val Thr Ile Thr Gly Pro  
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Thr Asp Ala Ile Phe Lys Ala Phe Ala Met Ile Ala Tyr Lys Phe Glu  
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Glu Asp Ile Ile Asn Ser Met Ser Asn Ser Pro Ala Thr Ser Lys Pro  
 115 120 125

Pro Val Thr Leu Arg Leu Val Val Pro Ala Ser Gln Cys Gly Ser Leu  
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Ile Gly Lys Gly Gly Ser Lys Ile Lys Glu Ile Arg Glu Ser Thr Gly  
 145 150 155 160

Ala Gln Val Gln Val Ala Gly Asp Met Leu Pro Asn Ser Thr Glu Arg  
165 170 175

Ala Val Thr Ile Ser Gly Thr Pro Asp Ala Ile Ile Gln Cys Val Lys  
180 185 190

Gln Ile Cys Val Val Met Leu Glu Ser Pro Pro Lys Gly Ala Thr Ile  
195 200 205

Pro Tyr Arg Pro Lys Pro Ala Ser Thr Pro Val Ile Phe Ala Gly Gly  
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Gln Ala Tyr Thr Ile Gln Gly Gln Tyr Ala Ile Pro His Pro Asp Gln  
225 230 235 240

Leu Thr Lys Leu His Gln Leu Ala Met Gln Gln Thr Pro Phe Pro Pro  
245 250 255

Leu Gly Gln Thr Asn Pro Ala Phe Pro Gly Glu Lys Leu Pro Leu His  
260 265 270

Ser Ser Glu Glu Ala Gln Asn Leu Met Gly Gln Ser Ser Gly Leu Asp  
275 280 285

Ala Ser Pro Pro Ala Ser Thr His Glu Leu Thr Ile Pro Asn Asp Leu  
290 295 300

Ile Gly Cys Ile Ile Gly Arg Gln Gly Thr Lys Ile Asn Glu Ile Arg  
305 310 315 320

Gln Met Ser Gly Ala Gln Ile Lys Ile Ala Asn Ala Thr Glu Gly Ser  
325 330 335

Ser Glu Arg Gln Ile Thr Ile Thr Gly Thr Pro Ala Asn Ile Ser Leu  
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Gly Thr Leu  
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<212> DNA

<213> Homo sapiens

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<400> 18

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Asn Lys Lys Asn Leu Ala Lys Ser Gln Thr Leu Leu Gly Lys Glu Ile  
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Lys Ile Leu Lys Glu Leu Lys His Glu Asn Ile Val Ala Leu Tyr Asp  
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Phe Gln Glu Met Ala Asn Ser Val Tyr Leu Val Met Glu Tyr Cys Asn  
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Gly Gly Asp Leu Ala Asp Tyr Leu His Ala Met Arg Thr Leu Ser Glu  
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Asp Thr Ile Arg Leu Phe Leu Gln Gln Ile Ala Gly Ala Met Arg Leu  
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Leu His Ser Lys Gly Ile Ile His Arg Asp Leu Lys Pro Gln Asn Ile  
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Leu Leu Ser Asn Pro Ala Gly Arg Arg Ala Asn Pro Asn Ser Ile Arg  
 145 150 155 160

Val Lys Ile Ala Asp Phe Gly Phe Ala Arg Tyr Leu Gln Ser Asn Met



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Arg Ala Gly Pro Phe Ser Ser Ser Arg Cys Gly Ala Ser Val Pro Ile  
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Pro Val Pro Thr Gln Val Gln Asn Tyr Gln Arg Ile Glu Arg Asn Leu  
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Gln Ser Pro Thr Gln Phe Gln Thr Pro Arg Ser Ser Ala Ile Arg Arg  
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Ser Gly Ser Thr Ser Pro Leu Gly Phe Ala Arg Ala Ser Pro Ser Pro  
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Pro Ala His Ala Glu His Gly Gly Val Leu Ala Arg Lys Met Ser Leu  
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Gly Gly Gly Arg Pro Tyr Thr Pro Ser Pro Gln Val Gly Thr Ile Pro  
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Glu Arg Pro Gly Trp Ser Gly Thr Pro Ser Pro Gln Gly Ala Glu Met  
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Pro Arg Thr Ser Gly Leu Gly Cys Arg Leu His Ser Ala Pro Asn Leu  
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Ser Asp Leu His Val Val Arg Pro Lys Leu Pro Lys Pro Pro Thr Asp  
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Pro Leu Gly Ala Val Phe Ser Pro Pro Gln Ala Ser Pro Pro Gln Pro  
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Ser His Gly Leu Gln Ser Cys Arg Asn Leu Arg Gly Ser Pro Lys Leu  
595 600 605

Pro Asp Phe Leu Gln Arg Asn Pro Leu Pro Pro Ile Leu Gly Ser Pro  
610 615 620

Thr Lys Ala Val Pro Ser Phe Asp Phe Pro Lys Thr Pro Ser Ser Gln  
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Asn Leu Leu Ala Leu Leu Ala Arg Gln Gly Val Val Met Thr Pro Pro  
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Arg Asn Arg Thr Leu Pro Asp Leu Ser Glu Val Gly Pro Phe His Gly  
660 665 670

Gln Pro Leu Gly Pro Gly Leu Arg Pro Gly Glu Asp Pro Lys Gly Pro  
675 680 685

Phe Gly Arg Ser Phe Ser Thr Ser Arg Leu Thr Asp Leu Leu Leu Lys  
690 695 700

Ala Ala Phe Gly Thr Gln Ala Pro Asp Pro Gly Ser Thr Glu Ser Leu  
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Gln Glu Lys Pro Met Glu Ile Ala Pro Ser Ala Gly Phe Gly Gly Ser  
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Leu His Pro Gly Ala Arg Ala Gly Gly Thr Ser Ser Pro Ser Pro Val  
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Val Phe Thr Val Gly Ser Pro Pro Ser Gly Ser Thr Pro Pro Gln Gly  
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Pro Arg Thr Arg Met Phe Ser Ala Gly Pro Thr Gly Ser Ala Ser Ser  
770 775 780

Ser Ala Arg His Leu Val Pro Gly Pro Cys Ser Glu Ala Pro Ala Pro  
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Glu Leu Pro Ala Pro Gly His Gly Cys Ser Phe Ala Asp Pro Ile Ala  
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850 855 860

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Ala Glu Gln Leu Val Leu Tyr Leu Lys Val Ala Glu Leu Leu Ser Ser  
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Gly Leu Gln Ser Ala Ile Asp Gln Ile Arg Ala Gly Lys Leu Cys Leu  
915 920 925

Ser Ser Thr Val Lys Gln Val Val Arg Arg Leu Asn Glu Leu Tyr Lys  
930 935 940

Ala Ser Val Val Ser Cys Gln Gly Leu Ser Leu Arg Leu Gln Arg Phe  
945 950 955 960

Phe Leu Asp Lys Gln Arg Leu Leu Asp Arg Ile His Ser Ile Thr Ala  
965 970 975

Glu Arg Leu Ile Phe Ser His Ala Val Gln Met Val Gln Ser Ala Ala  
980 985 990

Leu Asp Glu Met Phe Gln His Arg Glu Gly Cys Val Pro Arg Tyr His  
995 1000 1005

Lys Ala Leu Leu Leu Leu Glu Gly Leu Gln His Met Leu Ser Asp  
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Gln Ala Asp Ile Glu Asn Val Thr Lys Cys Lys Leu Cys Ile Glu  
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Arg Arg Leu Ser Ala Leu Leu Thr Gly Ile Cys Ala  
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Ile Ala Asn Ser Gly Ser Ala Gly Leu Ile Asn Pro Ala Ala Thr Val  
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Asn Asp Glu Ser Gly Arg Asp Ser Glu Val Ser Ala Arg Glu His Met  
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Ser Ser Ser Ser Ser Leu Gln Ser Arg Glu Glu Lys Gln Glu Pro Val  
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Val Val Arg Pro Tyr Pro Gln Val Gln Met Leu Ser Thr His His Ala  
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Val Ala Ser Ala Thr Pro Val Ala Val Thr Ala Pro Pro Ala His Leu  
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Thr Pro Ala Val Pro Leu Ser Phe Ser Glu Gly Leu Met Lys Pro Pro  
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Pro Lys Pro Thr Met Pro Ser Arg Pro Ile Ala Pro Ala Pro Pro Ser  
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Thr Leu Ser Leu Pro Pro Lys Val Pro Gly Gln Val Thr Val Thr Met  
165 170 175

Glu Ser Ser Ile Pro Gln Ala Ser Ala Ile Pro Val Ala Thr Ile Ser  
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Gly Gln Gln Gly His Pro Ser Asn Leu His His Ile Met Thr Thr Asn  
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Val Gln Met Ser Ile Ile Arg Ser Asn Ala Pro Gly Pro Pro Leu His  
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Ile Gly Ala Ser His Leu Pro Arg Gly Ala Ala Ala Ala Val Met  
225 230 235 240

Ser Ser Ser Lys Val Thr Thr Val Leu Arg Pro Thr Ser Gln Leu Pro  
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Asn Ala Ala Thr Ala Gln Pro Ala Val Gln His Ile Ile His Gln Pro  
260 265 270

Ile Gln Ser Arg Pro Pro Val Thr Thr Ser Asn Ala Ile Pro Pro Ala  
275 280 285

Val Val Ala Thr Val Ser Ala Thr Arg Ala Gln Ser Pro Val Ile Thr  
290 295 300

Thr Thr Ala Ala His Ala Thr Asp Ser Ala Leu Ser Arg Pro Thr Leu  
305 310 315 320



Ser Ile Gln His Pro Pro Ser Ala Ala Ile Ser Ile Gln Arg Pro Ala  
325 330 335

Gln Ser Arg Asp Val Thr Thr Arg Ile Thr Leu Pro Ser His Pro Ala  
340 345 350

Leu Gly Thr Pro Lys Gln Gln Leu His Thr Met Ala Gln Lys Thr Ile  
355 360 365

Phe Ser Thr Gly Thr Pro Val Ala Ala Ala Thr Val Ala Pro Ile Leu  
370 375 380

Ala Thr Asn Thr Ile Pro Ser Ala Thr Thr Ala Gly Ser Val Ser His  
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Thr Gln Ala Pro Thr Ser Thr Ile Val Thr Met Thr Val Pro Ser His  
405 410 415

Ser Ser His Ala Thr Ala Val Thr Thr Ser Asn Ile Pro Val Ala Lys  
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Val Val Pro Gln Gln Ile Thr His Thr Ser Pro Arg Ile Gln Pro Asp  
435 440 445

Tyr Pro Ala Glu Arg Ser Ser Leu Ile Pro Ile Ser Gly His Arg Ala  
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Ser Pro Asn Pro Val Ala Met Glu Thr Arg Ser Asp Asn Arg Pro Ser  
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Val Pro Val Gln Phe Gln Tyr Phe Leu Pro Thr Tyr Pro Pro Ser Ala  
485 490 495

Tyr Pro Leu Ala Ala His Thr Tyr Thr Pro Ile Thr Ser Ser Val Ser  
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Thr Ile Arg Gln Tyr Pro Val Ser Ala Gln Ala Pro Asn Ser Ala Ile  
515 520 525

Thr Ala Gln Thr Gly Val Gly Val Ala Ser Thr Val His Leu Asn Pro  
530 535 540

Met Gln Leu Met Thr Val Asp Ala Ser His Ala Arg His Ile Gln Gly  
545 550 555 560

Ile Gln Pro Ala Pro Ile Ser Thr Gln Gly Ile Gln Pro Ala Pro Ile  
565 570 575

Gly Thr Pro Gly Ile Gln Pro Ala Pro Leu Gly Thr Gln Gly Ile His  
580 585 590

Ser Ala Thr Pro Ile Asn Thr Gln Gly Leu Gln Pro Ala Pro Met Gly  
595 600 605

Thr Gln Gln Pro Gln Pro Glu Gly Lys Thr Ser Ala Val Val Leu Ala  
610 615 620

Asp Gly Ala Thr Ile Val Ala Asn Pro Ile Ser Asn Pro Phe Ser Ala  
625 630 635 640

Ala Pro Ala Ala Thr Thr Val Val Gln Thr His Ser Gln Ser Ala Ser  
645 650 655

Thr Asn Ala Pro Ala Gln Gly Ser Ser Pro Arg Pro Ser Ile Leu Arg  
660 665 670

Lys Lys Pro Ala Thr Asp Gly Met Ala Val Arg Lys Thr Leu Ile Pro  
675 680 685

Pro Gln Pro Pro Asp Val Ala Ser Pro Arg Val Glu Ser Ser Met Arg  
690 695 700

Ser Thr Ser Gly Ser Pro Arg Pro Ala Gly Ala Lys Pro Lys Ser Glu  
705 710 715 720

Ile His Val Ser Met Ala Thr Pro Val Thr Val Ser Met Glu Thr Val  
725 730 735

Ser Asn Gln Asn Asn Asp Gln Pro Thr Ile Ala Val Pro Pro Thr Ala  
740 745 750

Gln Gln Pro Pro Pro Thr Ile Pro Thr Met Ile Ala Ala Ala Ser Pro  
755 760 765

Pro Ser Gln Pro Ala Val Ala Leu Ser Thr Ile Pro Gly Ala Val Pro

770

775

780

Ile Thr Pro Pro Ile Thr Thr Ile Ala Ala Ala Pro Pro Pro Ser Val  
785 790 795 800

Thr Val Gly Gly Ser Leu Ser Ser Val Leu Gly Pro Pro Val Pro Glu  
805 810 815

Ile Lys Val Lys Glu Glu Val Glu Pro Met Asp Ile Met Arg Pro Val  
820 825 830

Ser Ala Val Pro Pro Leu Ala Thr Asn Thr Val Ser Pro Ser Leu Ala  
835 840 845

Leu Leu Ala Asn Asn Leu Ser Met Pro Thr Ser Asp Leu Pro Pro Gly  
850 855 860

Ala Ser Pro Arg Lys Lys Pro Arg Lys Gln Gln His Val Ile Ser Thr  
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Glu Glu Gly Asp Met Met Glu Thr Asn Ser Thr Asp Asp Glu Lys Ser  
885 890 895

Thr Ala Lys Ser Leu Leu Val Lys Ala Glu Lys Arg Lys Ser Pro Pro  
900 905 910

Lys Glu Tyr Ile Asp Glu Glu Gly Val Arg Tyr Val Pro Val Arg Pro  
915 920 925

Arg Pro Pro Ile Thr Leu Leu Arg His Tyr Arg Asn Pro Trp Lys Ala  
930 935 940

Ala Tyr His His Phe Gln Arg Tyr Ser Asp Val Arg Val Lys Glu Glu  
945 950 955 960

Lys Lys Ala Met Leu Gln Glu Ile Ala Asn Gln Lys Gly Val Ser Cys  
965 970 975

Arg Ala Gln Gly Trp Lys Val His Leu Cys Ala Ala Gln Leu Leu Gln  
980 985 990

Leu Thr Asn Leu Glu His Asp Val Tyr Glu Arg Leu Thr Asn Leu Gln  
995 1000 1005

Glu Gly Ile Ile Pro Lys Lys Lys Ala Ala Thr Asp Asp Asp Leu  
1010 1015 1020

His Arg Ile Asn Glu Leu Ile Gln Gly Asn Met Gln Arg Cys Lys  
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Leu Val Met Asp Gln Ile Ser Glu Ala Arg Asp Ser Met Leu Lys  
1040 1045 1050

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Lys Arg Arg Arg Asp Arg Ile Asn Asn Ser Leu Ser Glu Leu Arg Arg	50	55	60
Leu Val Pro Thr Ala Phe Glu Lys Gln Gly Ser Ala Lys Leu Glu Lys	65	70	75
Ala Glu Ile Leu Gln Met Thr Val Asp His Leu Lys Met Leu Gln Ala	85	90	95
Thr Gly Gly Lys Gly Tyr Phe Asp Ala His Ala Leu Ala Met Asp Phe	100	105	110
Met Ser Ile Gly Phe Arg Glu Cys Leu Thr Glu Val Ala Arg Tyr Leu	115	120	125
Ser Ser Val Glu Gly Leu Asp Ser Ser Asp Pro Leu Arg Val Arg Leu	130	135	140
Val Ser His Leu Ser Thr Cys Ala Thr Gln Arg Glu Ala Ala Ala Met	145	150	155
Thr Ser Ser Met Ala His His His His Pro Leu His Pro His His Trp	165	170	175
Ala Ala Ala Phe His His Leu Pro Ala Ala Leu Leu Gln Pro Asn Gly	180	185	190
Leu His Ala Ser Glu Ser Thr Pro Cys Arg Leu Ser Thr Thr Ser Glu	195	200	205
Val Pro Pro Ala His Gly Ser Ala Leu Leu Thr Ala Thr Phe Ala His	210	215	220
Ala Asp Ser Ala Leu Arg Met Pro Ser Thr Gly Ser Val Ala Pro Cys	225	230	235
			240

Val Pro Pro Leu Ser Thr Ser Leu Leu Ser Leu Ser Ala Thr Val His  
 245 250 255

Ala Ala Ala Ala Ala Ala Thr Ala Ala Ala His Ser Phe Pro Leu Ser  
 260 265 270

Phe Ala Gly Ala Phe Pro Met Leu Pro Pro Asn Ala Ala Ala Val  
 275 280 285

Ala Ala Ala Thr Ala Ile Ser Pro Pro Leu Ser Val Ser Ala Thr Ser  
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			20					25					30		

Lys Phe Ser Asn Gln Glu Thr Cys Val Glu Ile Gly Glu Ser Val Arg  
35 40 45

Gly Glu Asp Val Tyr Ile Val Gln Ser Gly Cys Gly Glu Ile Asn Asp  
50 55 60

Asn Leu Met Glu Leu Leu Ile Met Ile Asn Ala Cys Lys Ile Ala Ser  
65 70 75 80

Ala Ser Arg Val Thr Ala Val Ile Pro Cys Phe Pro Tyr Ala Arg Gln  
85 90 95

Asp Lys Lys Asp Lys Ser Arg Ala Pro Ile Ser Ala Lys Leu Val Ala  
100 105 110

Asn Met Leu Ser Val Ala Gly Ala Asp His Ile Ile Thr Met Asp Leu  
115 120 125

His Ala Ser Gln Ile Gln Gly Phe Phe Asp Ile Pro Val Asp Asn Leu  
130 135 140

Tyr Ala Glu Pro Ala Val Leu Lys Trp Ile Arg Glu Asn Ile Ser Glu  
145 150 155 160

Trp Arg Asn Cys Thr Ile Val Ser Pro Asp Ala Gly Gly Ala Lys Arg  
165 170 175

Val Thr Ser Ile Ala Asp Arg Leu Asn Val Asp Phe Ala Leu Ile His  
180 185 190

Lys Glu Arg Lys Lys Ala Asn Glu Val Asp Arg Met Val Leu Val Gly  
195 200 205

Asp Val Lys Asp Arg Val Ala Ile Leu Val Asp Asp Met Ala Asp Thr  
210 215 220

Cys Gly Thr Ile Cys His Ala Ala Asp Lys Leu Leu Ser Ala Gly Ala  
225 230 235 240

Thr Arg Val Tyr Ala Ile Leu Thr His Gly Ile Phe Ser Gly Pro Ala  
245 250 255

Ile Ser Arg Ile Asn Asn Ala Cys Phe Glu Ala Val Val Val Thr Asn

260

265

270

Thr Ile Pro Gln Glu Asp Lys Met Lys His Cys Ser Lys Ile Gln Val  
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Gly Glu Ser Val Ser Tyr Leu Phe Ser His Val Pro Leu  
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35 40 45

Thr Pro Tyr Glu Gly Gly Arg Tyr Gln Leu Glu Ile Lys Ile Pro Glu  
50 55 60

Thr Tyr Pro Phe Asn Pro Pro Lys Val Arg Phe Ile Thr Lys Ile Trp  
65 70 75 80

His Pro Asn Ile Ser Ser Val Thr Gly Ala Ile Cys Leu Asp Ile Leu  
85 90 95

Lys Asp Gln Trp Ala Ala Ala Met Thr Leu Arg Thr Val Leu Leu Ser  
100 105 110

Leu Gln Ala Leu Leu Ala Ala Ala Glu Pro Asp Asp Pro Gln Asp Ala  
115 120 125

Val Val Ala Asn Gln Tyr Lys Gln Asn Pro Glu Met Phe Lys Gln Thr  
130 135 140

Ala Arg Leu Trp Ala His Val Tyr Ala Gly Ala Pro Val Ser Ser Pro  
145 150 155 160

Glu Tyr Thr Lys Lys Ile Glu Asn Leu Cys Ala Met Gly Phe Asp Arg  
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Ser Gly Ala Pro Val Trp Glu Leu Pro Gly Cys Phe Ser Lys Gln Arg  
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His Tyr Phe Ala Phe Pro Pro Ala Val Cys Glu Asn Ser Asn Phe Ser  
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Ile Ser Leu Thr Thr Leu Ala Ile Cys Thr Phe Val Ile Ser His Pro  
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Gly Gly Tyr Glu Val Val Ser His Trp Asn Phe Asp Phe His Phe Pro  
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Asp Asp His Cys Lys Ser Phe Lys Ile Tyr Ser Leu Gly Arg Ala Cys  
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Trp Leu Met Pro Val Ile Pro Ala Leu Trp Glu Asp Glu Ala Gly Gly  
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Ser Pro Ala Val Gln Glu Phe Arg Thr Ser Leu Thr Asn Lys Leu Leu  
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His Val Ala Ser Glu Ser Tyr Ala Val Lys Arg Phe Lys Gln Phe Phe  
165 170 175

Cys Leu Ser Leu Pro Ser Ser Trp Asp Tyr Ser Phe Gln Lys Lys Thr  
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Tyr Ser Lys Met Asn Asn Pro Ala Ile Lys Arg Ile Gly Asn His Ile  
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Thr Lys Ser Pro Glu Asp Lys Arg Glu Tyr Arg Gly Leu Glu Leu Ala  
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Asn Gly Ile Lys Val Leu Leu Ile Ser Asp Pro Thr Thr Asp Lys Ser  
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Ser Ala Ala Leu Asp Val His Ile Gly Ser Leu Ser Asp Pro Pro Asn  
245 250 255

Ile Ala Gly Leu Ser His Phe Cys Glu His Met Leu Phe Leu Gly Thr  
260 265 270

Lys Lys Tyr Pro Lys Glu Asn Glu Tyr Ser Gln Phe Leu Ser Glu His  
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Ala Gly Ser Ser Asn Ala Phe Thr Ser Gly Glu His Thr Asn Tyr Tyr  
290 295 300

Phe Asp Val Ser His Glu His Leu Glu Gly Ala Leu Asp Arg Phe Ala  
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Gln Phe Phe Leu Cys Pro Leu Phe Asp Glu Ser Cys Lys Asp Arg Glu  
325 330 335

Val Asn Ala Val Asp Ser Glu His Glu Lys Asn Val Met Asn Asp Ala  
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Trp Arg Leu Phe Gln Leu Glu Lys Ala Thr Gly Asn Pro Lys His Pro  
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Phe Ser Lys Phe Gly Thr Gly Asn Lys Tyr Thr Leu Glu Thr Arg Pro  
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Asn Gln Glu Gly Ile Asp Val Arg Gln Glu Leu Leu Lys Phe His Ser  
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Ala Tyr Tyr Ser Ser Asn Leu Met Ala Val Cys Val Leu Gly Arg Glu  
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Ser Leu Asp Asp Leu Thr Asn Leu Val Val Lys Leu Phe Ser Glu Val  
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Glu Asn Lys Asn Val Pro Leu Pro Glu Phe Pro Glu His Pro Phe Gln  
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Glu Glu His Leu Lys Gln Leu Tyr Lys Ile Val Pro Ile Lys Asp Ile  
450 455 460

Arg Asn Leu Tyr Val Thr Phe Pro Ile Pro Asp Leu Gln Lys Tyr Tyr  
465 470 475 480

Lys Ser Asn Pro Gly His Tyr Leu Gly His Leu Ile Gly His Glu Gly  
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Pro Gly Ser Leu Leu Ser Glu Leu Lys Ser Lys Gly Trp Val Asn Thr  
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Leu Val Gly Gly Gln Lys Glu Gly Ala Arg Gly Phe Met Phe Phe Ile  
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Ile Asn Val Asp Leu Thr Glu Glu Gly Leu Leu His Val Glu Asp Ile

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Ile Leu His Met Phe Gln Tyr Ile Gln Lys Leu Arg Ala Glu Gly Pro				
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Gly Ile Leu His Tyr Tyr Pro Leu Glu Glu Val Leu Thr Ala Glu Tyr				
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Gly Lys Thr Asp Arg Thr Glu Glu Trp Tyr Gly Thr Gln Tyr Lys Gln				
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Glu Ala Ile Pro Asp Glu Val Ile Lys Lys Trp Gln Asn Ala Asp Leu				
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Asn Gly Lys Phe Lys Leu Pro Thr Lys Asn Glu Phe Ile Pro Thr Asn				
	675		680	685
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	690		695	700
Ile Lys Asp Thr Ala Met Ser Lys Leu Trp Phe Lys Gln Asp Asp Lys				
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Ala Tyr Val Asp Pro Leu His Cys Asn Met Ala Tyr Leu Tyr Leu Glu				
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Leu Leu Lys Asp Ser Leu Asn Glu Tyr Ala Tyr Ala Ala Glu Leu Ala				
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Gly Leu Ser Tyr Asp Leu Gln Asn Thr Ile Tyr Gly Met Tyr Leu Ser  
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Val Lys Gly Tyr Asn Asp Lys Gln Pro Ile Leu Leu Lys Lys Ile Ile  
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Glu Lys Met Ala Thr Phe Glu Ile Asp Glu Lys Arg Phe Glu Ile Ile  
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Lys Glu Ala Tyr Met Arg Ser Leu Asn Asn Phe Arg Ala Glu Gln Pro  
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His Gln His Ala Met Tyr Tyr Leu Arg Leu Leu Met Thr Glu Val Ala  
835 840 845

Trp Thr Lys Asp Glu Leu Lys Glu Ala Leu Asp Asp Val Thr Leu Pro  
850 855 860

Arg Leu Lys Ala Phe Ile Pro Gln Leu Leu Ser Arg Leu His Ile Glu  
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Ala Leu Leu His Gly Asn Ile Thr Lys Gln Ala Ala Leu Gly Ile Met  
885 890 895

Gln Met Val Glu Asp Thr Leu Ile Glu His Ala His Thr Lys Pro Leu  
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Leu Arg Thr Lys Glu Gln Leu Gly Tyr Ile Val Phe Ser Gly Pro Arg  
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Met Glu Lys Ser Ile Glu Asp Met Thr Glu Glu Ala Phe Gln Lys  
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His Ile Gln Ala Leu Ala Ile Arg Arg Leu Asp Lys Pro Lys Lys  
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Leu Ser Ala Glu Cys Ala Lys Tyr Trp Gly Glu Ile Ile Ser Gln  
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Gln Tyr Asn Phe Asp Arg Asp Asn Thr Glu Val Ala Tyr Leu Lys  
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Thr Leu Thr Lys Glu Asp Ile Ile Lys Phe Tyr Lys Glu Met Leu  
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Ala Val Asp Ala Pro Arg Arg His Lys Val Ser Val His Val Leu  
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Ala Arg Glu Met Asp Ser Cys Pro Val Val Gly Glu Phe Pro Cys  
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Lys Lys Glu Lys Glu Lys Lys Ala Glu Asp Leu Asp Phe Trp Leu Ser



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25

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Gln Asp Gln Asp Lys Lys Ser Pro Lys Pro Lys Lys Lys Lys His Arg  
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Lys Glu Lys Glu Glu Arg Thr Lys Gly Lys Lys Lys Ser Lys Lys Gln  
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Pro Pro Gly Gln Glu Glu Glu Gln Leu Pro Pro Glu Ser Ser Tyr Ser  
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Arg Ser Ser Ser Ile Leu Lys Gly Met Glu Leu Ser Val Leu Asp Ser  
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Leu Asn Ala Arg Met Ala Arg Pro Gln Gly Ser Ser Val His Asp Gly  
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Val Pro Val Pro Phe Gln Leu Pro Pro Gly Val Ser Asn Glu Ala Gln  
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Tyr Val Phe Thr Ile Gln Ser Ile Val Met Ala Gln Lys Leu Lys Gly  
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Thr Leu Ser Phe Ile Ala Lys Asn Asp Glu Gly Ala Thr His Glu Lys  
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Leu Asp Phe Arg Leu His Phe Ser Cys Ser Ser Tyr Leu Ile Thr Thr  
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Pro Cys Tyr Ser Asp Ala Phe Ala Lys Leu Leu Glu Ser Gly Asp Leu  
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Ser Met Ser Ser Ile Lys Val Asp Gly Ile Arg Met Ser Phe Gln Asn  
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Leu Leu Ala Lys Ile Cys Phe His His His Phe Ser Val Val Glu Arg  
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Val Asp Ser Cys Ala Ser Met Tyr Ser Arg Ser Ile Gln Gly His His  
 305 310 315 320

Val Cys Leu Leu Val Lys Lys Gly Glu Asn Ser Val Ser Val Asp Gly  
 325 330 335

Lys Cys Ser Asp Ser Thr Leu Leu Ser Asn Leu Leu Glu Glu Met Lys  
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Ala Thr Leu Ala Lys Cys Val Arg Ala Ala Cys Glu Pro Arg Thr Thr  
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Pro Arg Ser Thr Tyr Pro Gly Thr Ala Ala Leu Thr Cys Leu Ala Ser  
 370 375 380

Pro Gln Ser Cys Val Leu Tyr Pro Ser Leu Ser Val Asn Leu Thr Leu  
 385 390 395 400

Cys Cys Pro Pro Cys Arg His Pro Arg Ser Phe Val Ala Leu Asn Tyr  
 405 410 415

Leu Thr Ile Leu Phe Tyr Cys Asp Ser Ser His Ser Leu Trp Gln Glu  
 420 425 430

Val Pro Phe Ser Pro Pro Asn Gln Gln Gly Thr Pro Pro Pro Gly Ser  
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Val Pro Cys Pro Ala Leu Gly Ala Glu Ser Leu Asn Val Ala Ser Gly  
 450 455 460

Ala Pro Val Leu Thr Val Ala Ser Gly Gly Gly Glu Gly Arg Ala Ala  
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Val Ala Lys Val Phe Ser Pro Arg Thr Pro Trp Ala Ala Ala Met Ala  
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Leu Lys Met Val Lys Gly Ser Ile Asp Arg Met Phe Asp Lys Asn Leu  
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Gln Asp Leu Val Arg Gly Ile Arg Asn His Lys Glu Asp Glu Ala Lys  
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Tyr Ile Ser Gln Cys Ile Asp Glu Ile Lys Gln Glu Leu Lys Gln Asp  
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Asn Ile Ala Val Lys Ala Asn Ala Val Cys Lys Leu Thr Tyr Leu Gln  
545 550 555 560

Met Leu Gly Tyr Asp Ile Ser Trp Ala Ala Phe Asn Ile Ile Glu Val  
565 570 575

Met Ser Ala Ser Lys Phe Thr Phe Lys Arg Ile Gly Tyr Leu Ala Ala  
580 585 590

Ser Gln Ser Phe His Glu Gly Thr Asp Val Ile Met Leu Thr Thr Asn  
595 600 605

Gln Ile Arg Lys Asp Leu Ser Ser Pro Ser Gln Tyr Asp Thr Gly Val  
610 615 620

Ala Leu Thr Gly Leu Ser Cys Phe Val Thr Pro Asp Leu Ala Arg Asp  
625 630 635 640

Leu Ala Asn Asp Ile Met Thr Leu Met Ser His Thr Lys Pro Tyr Ile  
645 650 655

Arg Lys Lys Ala Val Leu Ile Met Tyr Lys Val Phe Leu Lys Tyr Pro  
660 665 670

Glu Ser Leu Arg Pro Ala Phe Pro Arg Leu Lys Glu Lys Leu Glu Asp  
675 680 685

Pro Asp Pro Gly Val Gln Ser Ala Ala Val Asn Val Ile Cys Glu Leu  
690 695 700

Ala Arg Arg Asn Pro Lys Asn Tyr Leu Ser Leu Ala Pro Leu Phe Phe  
705 710 715 720

Lys Leu Met Thr Ser Ser Thr Asn Asn Trp Val Leu Ile Lys Ile Ile  
725 730 735

Lys Leu Phe Gly Ala Leu Thr Pro Leu Glu Pro Arg Leu Gly Lys Lys  
740 745 750

Leu Ile Glu Pro Leu Thr Asn Leu Ile His Ser Thr Ser Ala Met Ser  
755 760 765

Leu Leu Tyr Glu Cys Val Asn Thr Val Ile Ala Val Leu Ile Ser Leu  
770 775 780

Ser Ser Gly Met Pro Asn His Ser Ala Ser Ile Gln Leu Cys Val Gln  
785 790 795 800

Lys Leu Arg Ile Leu Ile Glu Asp Ser Asp Gln Asn Leu Lys Tyr Leu  
805 810 815

Gly Leu Leu Ala Met Ser Lys Ile Leu Lys Thr His Pro Lys Ser Val  
820 825 830

Gln Ser His Lys Asp Leu Ile Leu Gln Cys Leu Asp Asp Lys Asp Glu  
835 840 845

Ser Ile Arg Leu Arg Ala Leu Asp Leu Leu Tyr Gly Met Val Ser Lys  
850 855 860

Lys Asn Leu Met Glu Ile Val Lys Lys Leu Met Thr His Val Asp Lys  
865 870 875 880

Ala Glu Gly Thr Thr Tyr Arg Asp Glu Leu Leu Thr Lys Ile Ile Asp  
885 890 895

Ile Cys Ser Gln Ser Asn Tyr Gln Tyr Ile Thr Asn Phe Glu Trp Tyr  
900 905 910

Ile Ser Ile Leu Val Glu Leu Thr Arg Leu Glu Gly Thr Arg His Gly  
915 920 925

His Leu Ile Ala Ala Gln Met Leu Asp Val Ala Ile Arg Val Lys Ala

930

935

940

Ile Arg Lys Phe Ala Val Ser Gln Met Ser Ala Leu Leu Asp Ser Ala  
 945 950 955 960

His Leu Leu Ala Ser Ser Thr Gln Arg Asn Gly Ile Cys Glu Val Leu  
 965 970 975

Tyr Ala Ala Ala Trp Ile Cys Gly Glu Phe Ser Glu His Leu Gln Glu  
 980 985 990

Pro His His Thr Leu Glu Ala Met Leu Arg Pro Arg Val Thr Thr Leu  
 995 1000 1005

Pro Gly His Ile Gln Ala Val Tyr Val Gln Asn Val Val Lys Leu  
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Tyr Ala Ser Ile Leu Gln Gln Lys Glu Gln Ala Gly Glu Ala Glu  
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Gly Ala Gln Ala Val Thr Gln Leu Met Val Asp Arg Leu Pro Gln  
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Phe Val Gln Ser Ala Asp Leu Glu Val Gln Glu Arg Ala Ser Cys  
 1055 1060 1065

Ile Leu Gln Leu Val Lys His Ile Gln Lys Leu Gln Ala Lys Asp  
 1070 1075 1080

Val Pro Val Ala Glu Glu Val Ser Ala Leu Phe Ala Gly Glu Leu  
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Asn Pro Val Ala Pro Lys Ala Gln Lys Lys Val Pro Val Pro Glu  
 1100 1105 1110

Gly Leu Asp Leu Asp Ala Trp Ile Asn Glu Pro Leu Ser Asp Ser  
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Glu Ser Glu Asp Glu Arg Pro Arg Ala Val Phe His Glu Glu Glu  
 1130 1135 1140

Gln Arg Arg Pro Lys His Arg Pro Ser Glu Ala Asp Glu Glu Glu  
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Leu Ala Arg Arg Arg Glu Ala Arg Lys Gln Glu Gln Ala Asn Asn  
1160 1165 1170

Pro Phe Tyr Ile Lys Ser Ser Pro Ser Pro Gln Lys Arg Tyr Gln  
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Asp Thr Pro Gly Val Glu His Ile Pro Val Val Gln Ile Asp Leu  
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Ser Val Pro Leu Lys Val Pro Gly Leu Pro Met Ser Asp Gln Tyr  
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Val Lys Leu Glu Glu Glu Arg Arg His Arg Gln Lys Leu Glu Lys  
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Asp Lys Arg Arg Lys Lys Arg Lys Glu Lys Glu Lys Lys Gly Lys  
1235 1240 1245

Arg Arg His Ser Ser Leu Pro Thr Glu Ser Asp Glu Asp Ile Ala  
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Pro Ala Gln Gln Val Asp Ile Val Thr Glu Glu Met Pro Glu Asn  
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Ala Leu Pro Ser Asp Glu Asp Asp Lys Asp Pro Asn Asp Pro Tyr  
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Arg Ala Leu Asp Ile Asp Leu Asp Lys Pro Leu Ala Asp Ser Glu  
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Pro Glu Lys Asp Val Pro Met Val Glu Lys Lys Ser Lys Lys Pro  
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Lys Lys Lys Glu Lys Lys His Lys Glu Lys Glu Arg Asp Lys Glu  
1340 1345 1350

Lys Lys Lys Glu Lys Glu Lys Lys Leu Arg Thr Trp Thr Ser Gly  
1355 1360 1365

Phe Tyr His Pro Gly Ile Pro Glu Ala Arg Trp Thr Arg Asp Leu  
1370 1375 1380

Lys Asp Gly Lys Glu Ile Asp Ala Leu Asp Lys Ser Thr Glu Arg  
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Glu His Gly Val Arg Asn Glu Gly Ser His Gly Ser Arg Arg Pro  
1400 1405 1410

Leu Asn Asp Leu Asp Val Ser Glu Leu Gly Gln His Arg Arg Tyr  
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Asp Asn Asp Asp Ile Ile Glu Trp Lys Pro Lys Pro His Asn Lys  
1430 1435 1440

Glu Pro Asn Gly Trp Gly Thr His Thr Glu Ile Gly Glu Tyr Ala  
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Tyr Thr Ala Ala Leu Met Pro Gln Thr Arg Ala Ala Asn His Ser  
1460 1465 1470

Lys Lys Gly Lys Asp Lys Asn Glu Arg Pro Thr Arg Asn Val Arg  
1475 1480 1485

His Lys Arg Ala Arg Asn Arg Gly Asp His Thr His Thr Val Pro  
1490 1495 1500

Glu Ile Gly Glu Asn Arg Lys His Gln Asp Pro Glu Lys Thr Gln  
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Ala Ser Arg Arg Lys Glu Gly Ser Thr Thr Arg Gln Thr Arg Gly  
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Gln Leu Thr Arg Tyr Ile Ile Pro Lys Arg Asp Lys Gly Gly Ala  
1535 1540 1545

Ser Ser Met Ile Glu His Glu Arg Pro His Glu Glu Tyr Ala Ala  
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Thr Pro Gly Thr Val Ala Ala Glu Tyr Ala Ile Arg Val Glu Ala  
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Gly Gln Arg Tyr Ser Arg Glu Thr Ser Glu Gly  
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<212> PRT  
<213> Homo sapiens

<400> 32

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Ala Phe Phe Val Gln Thr Cys Arg Glu Glu His Lys Lys Lys His Pro  
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Asp Ala Ser Val Asn Phe Ser Glu Phe Ser Lys Lys Cys Ser Glu Arg  
35 40 45

Trp Lys Thr Met Ser Ala Lys Glu Lys Gly Lys Phe Glu Asp Met Ala  
50 55 60

Lys Ala Asp Lys Ala Arg Tyr Glu Arg Glu Met Lys Thr Tyr Ile Pro  
65 70 75 80

Pro Lys Gly Glu Thr Lys Lys Lys Phe Lys Asp Pro Asn Ala Pro Lys  
85 90 95

Arg Pro Pro Ser Ala Phe Phe Leu Phe Cys Ser Glu Tyr Arg Pro Lys  
100 105 110

Ile Lys Gly Glu His Pro Gly Leu Ser Ile Gly Asp Val Ala Lys Lys

115

120

125

Leu Gly Glu Met Trp Asn Asn Thr Ala Ala Asp Asp Lys Gln Pro Tyr  
 130 135 140

Glu Lys Lys Ala Ala Lys Leu Lys Glu Lys Tyr Glu Lys Asp Ile Ala  
 145 150 155 160

Ala Tyr Arg Ala Lys Gly Lys Pro Asp Ala Ala Lys Lys Gly Val Val  
 165 170 175

Lys Ala Glu Lys Ser Lys Lys Lys Lys Glu Glu Glu Glu Asp Glu Glu  
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Asp Glu Glu Asp Glu Glu Glu Glu Glu Asp Glu Glu Asp Glu Asp Glu  
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Glu Glu Asp Asp Asp Asp Glu  
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<400> 34

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Gly Ile Arg Lys Cys Gly Pro Arg Arg Arg Arg Arg Arg Arg Arg  
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Arg Thr Gly Ala Gln Ala Gly Gly Pro Gly Pro Pro Ala Pro Glu Arg  
 35 40 45

Arg Asn Gly Arg Met Gln Gln Pro Gln Pro Gln Gly Gln Gln Gln Pro  
 50 55 60

Gly Pro Gly Gln Gln Leu Gly Gly Gln Gly Ala Ala Pro Gly Ala Gly

65

70

75

80

Gly Gly Pro Gly Gly Gly Pro Gly Pro Gly Pro Cys Leu Arg Arg Glu  
85 90 95

Leu Lys Leu Leu Glu Ser Ile Phe His Arg Gly His Glu Arg Phe Arg  
100 105 110

Ile Ala Ser Ala Cys Leu Asp Glu Leu Ser Cys Glu Phe Leu Leu Ala  
115 120 125

Gly Ala Gly Gly Ala Gly Ala Gly Ala Ala Pro Gly Pro His Leu Pro  
130 135 140

Pro Arg Gly Ser Val Pro Gly Asp Pro Val Arg Ile His Cys Asn Ile  
145 150 155 160

Thr Glu Ser Tyr Pro Ala Val Pro Pro Ile Trp Ser Val Glu Ser Asp  
165 170 175

Asp Pro Asn Leu Ala Ala Val Leu Glu Arg Leu Val Asp Ile Lys Lys  
180 185 190

Gly Asn Thr Leu Leu Leu Gln His Leu Lys Arg Ile Ile Ser Asp Leu  
195 200 205

Cys Lys Leu Tyr Asn Leu Pro Gln His Pro Asp Val Glu Met Leu Asp  
210 215 220

Gln Pro Leu Pro Ala Glu Gln Cys Thr Gln Glu Asp Val Ser Ser Glu  
225 230 235 240

Asp Glu Asp Glu Glu Met Pro Glu Asp Thr Glu Asp Leu Asp His Tyr  
245 250 255

Glu Met Lys Glu Glu Glu Pro Ala Glu Gly Lys Lys Ser Glu Asp Asp  
260 265 270

Gly Ile Gly Lys Glu Asn Leu Ala Ile Leu Glu Lys Ile Lys Lys Asn  
275 280 285

Gln Arg Gln Asp Tyr Leu Asn Gly Ala Val Ser Gly Ser Val Gln Ala  
290 295 300

Thr Asp Arg Leu Met Lys Glu Leu Arg Asp Ile Tyr Arg Ser Gln Ser  
305 310 315 320

Phe Lys Gly Gly Asn Tyr Ala Val Glu Leu Val Asn Asp Ser Leu Tyr  
325 330 335

Asp Trp Asn Val Lys Leu Leu Lys Val Asp Gln Asp Ser Ala Leu His  
340 345 350

Asn Asp Leu Gln Ile Leu Lys Glu Lys Glu Gly Ala Asp Phe Ile Leu  
355 360 365

Leu Asn Phe Ser Phe Lys Asp Asn Phe Pro Phe Asp Pro Pro Phe Val  
370 375 380

Arg Val Val Ser Pro Val Leu Ser Gly Gly Tyr Val Leu Gly Gly Gly  
385 390 395 400

Ala Ile Cys Met Glu Leu Leu Thr Lys Gln Gly Trp Ser Ser Ala Tyr  
405 410 415

Ser Ile Glu Ser Val Ile Met Gln Ile Ser Ala Thr Leu Val Lys Gly  
420 425 430

Lys Ala Arg Val Gln Phe Gly Ala Asn Lys Ser Gln Tyr Ser Leu Thr  
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Arg Ala Gln Gln Ser Tyr Lys Ser Leu Val Gln Ile His Glu Lys Asn  
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Gly Trp Tyr Thr Pro Pro Lys Glu Asp Gly  
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<212> DNA  
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20          25          30

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Val Asn Gly Val His His Ile Lys Val Ser Leu Glu Glu Lys Asn Ala
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```

Thr Ile Ile Tyr Asp Pro Lys Leu Gln Thr Pro Lys Thr Leu Gln Glu
50          55          60

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Ala Ile Asp Asp Met Gly Phe Asp Ala Val Ile His Asn Pro Asp Pro
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Leu Pro Val Leu Thr Asp Thr Leu Phe Leu Thr Val Thr Ala Ser Leu
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Thr Leu Pro Trp Asp His Ile Gln Ser Thr Leu Leu Lys Thr Lys Gly
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Val Thr Asp Ile Lys Ile Tyr Pro Gln Lys Arg Thr Val Ala Val Thr  
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Ile Ile Pro Ser Ile Val Asn Ala Asn Gln Ile Lys Glu Leu Val Pro  
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Glu Leu Ser Leu Asp Thr Gly Thr Leu Glu Lys Lys Ser Gly Ala Cys  
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Glu Asp His Ser Met Ala Gln Ala Gly Glu Val Val Leu Lys Met Lys  
165 170 175

Val Glu Gly Met Thr Cys His Ser Cys Thr Ser Thr Ile Glu Gly Lys  
180 185 190

Ile Gly Lys Leu Gln Gly Val Gln Arg Ile Lys Val Ser Leu Asp Asn  
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Gln Glu Ala Thr Ile Val Tyr Gln Pro His Leu Ile Ser Val Glu Glu  
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Met Lys Lys Gln Ile Glu Ala Met Gly Phe Pro Ala Phe Val Lys Lys  
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Gln Pro Lys Tyr Leu Lys Leu Gly Ala Ile Asp Val Glu Arg Leu Lys  
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Asn Thr Pro Val Lys Ser Ser Glu Gly Ser Gln Gln Arg Ser Pro Ser  
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Tyr Thr Asn Asp Ser Thr Ala Thr Phe Ile Ile Asp Gly Met His Cys  
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Lys Ser Cys Val Ser Asn Ile Glu Ser Thr Leu Ser Ala Leu Gln Tyr  
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Val Ser Ser Ile Val Val Ser Leu Glu Asn Arg Ser Ala Ile Val Lys  
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Tyr Asn Ala Ser Ser Val Thr Pro Glu Ser Leu Arg Lys Ala Ile Val  
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Ala Val Ser Pro Gly Leu Tyr Arg Val Ser Ile Thr Ser Glu Val Glu

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345

350

Ser Thr Ser Asn Ser Pro Ser Ser Ser Ser Leu Gln Lys Ile Pro Leu  
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Lys Lys Pro Gly Val Lys Ser Ile Arg Val Ser Leu Ala Asn Ser Asn  
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Gly Thr Val Glu Tyr Asp Pro Leu Leu Thr Ser Pro Glu Thr Leu Arg  
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Phe Ile Arg Glu Leu Gly Phe Gly Ala Thr Val Ile Glu Asn Ala Asp  
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Glu Gly Asp Gly Val Leu Glu Leu Val Val Arg Gly Met Thr Cys Ala  
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Asp Pro Glu Ile Ile Gly Pro Arg Asp Ile Ile His Thr Ile Glu Ser  
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Leu Gly Phe Glu Ala Ser Leu Val Lys Lys Asp Arg Ser Ala Ser His  
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Leu Asp His Lys Arg Glu Ile Arg Gln Trp Arg Arg Ser Phe Leu Val  
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Lys Arg Val Ala Met Val Gly Asp Gly Ile Asn Asp Ser Pro Ala				
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35 40 45

Asp Gln Tyr Thr Leu Glu His Met His Ala Phe Gly Met Tyr Asn Tyr  
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Leu His Cys Asp Ser Trp Tyr Gln Asp Ser Val Tyr Tyr Ile Asp Thr  
65 70 75 80

Leu Gly Arg Ile Met Asn Leu Thr Val Met Leu Asp Thr Ala Leu Gly  
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Lys Pro Arg Glu Val Phe Arg Leu Pro Thr Asp Leu Thr Ala Cys Asp  
100 105 110

Asn Arg Leu Cys Ala Ser Ile His Phe Ser Ser Ser Thr Trp Val Thr  
115 120 125

Leu Ser Asp Gly Thr Gly Arg Leu Tyr Val Ile Gly Thr Gly Glu Arg  
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Gly Asn Ser Ala Ser Glu Lys Trp Glu Ile Met Phe Asn Glu Glu Leu  
145 150 155 160

Gly Asp Pro Phe Ile Ile Ile His Ser Ile Ser Leu Leu Asn Ala Glu  
165 170 175

Glu His Ser Ile Ala Thr Leu Leu Leu Arg Ile Glu Lys Glu Glu Leu  
180 185 190

Asp Met Lys Gly Ser Gly Phe Tyr Val Ser Leu Glu Trp Val Thr Ile  
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Ser Lys Lys Asn Gln Asp Asn Lys Lys Tyr Glu Ile Ile Lys Arg Asp

210

215

220

Ile Leu Arg Gly Lys Ser Val Pro His Tyr Ala Ala Ile Glu Pro Asp  
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Gly Asn Gly Leu Met Ile Val Ser Tyr Lys Ser Phe Thr Phe Val Gln  
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Ala Gly Gln Asp Leu Glu Glu Asn Met Asp Glu Asp Ile Ser Glu Lys  
 260 265 270

Ile Lys Glu Pro Leu Tyr Tyr Trp Gln Gln Thr Glu Asp Asp Leu Thr  
 275 280 285

Val Thr Ile Arg Leu Pro Glu Asp Ser Thr Lys Glu Asp Ile Gln Ile  
 290 295 300

Gln Phe Leu Pro Asp His Ile Asn Ile Val Leu Lys Asp His Gln Phe  
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Leu Glu Gly Lys Leu Tyr Ser Ser Ile Asp His Glu Ser Ser Thr Trp  
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Ile Ile Lys Glu Ser Asn Ser Leu Glu Ile Ser Leu Ile Lys Lys Asn  
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Glu Gly Leu Thr Trp Pro Glu Leu Val Ile Gly Asp Lys Gln Gly Glu  
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Leu Ile Arg Asp Ser Ala Gln Cys Ala Ala Ile Ala Glu Arg Leu Met  
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His Leu Thr Ser Glu Glu Leu Asn Pro Asn Pro Asp Lys Glu Lys Pro  
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Pro Cys Asn Ala Gln Glu Leu Glu Glu Cys Asp Ile Phe Phe Glu Glu  
 405 410 415

Ser Ser Ser Leu Cys Arg Phe Asp Gly Asn Thr Leu Lys Thr Thr His  
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Val Val Asn Leu Gly Ser Asn Gln Tyr Leu Phe Ser Val Ile Val Asp  
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Pro Lys Glu Met Pro Cys Phe Cys Leu Arg His Asp Val Asp Ala Leu  
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Leu Trp Gln Pro His Ser Ser Lys Gln Asp Asp Met Trp Glu His Ile  
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Ala Thr Phe Asn Ala Leu Gly Tyr Val Gln Ala Ser Lys Arg Asp Lys  
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Lys Phe Phe Ala Cys Ala Pro Asn Tyr Ser Tyr Ala Ala Leu Cys Glu  
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Cys Leu Arg Arg Val Phe Ile Tyr Arg Gln Pro Ala Pro Met Ser Thr  
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Val Leu Tyr Asn Arg Lys Glu Gly Arg Gln Val Gly Gln Val Ala Lys  
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Gln Gln Val Ala Ser Leu Glu Thr Asn Asp Pro Ile Leu Gly Phe Gln  
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Ala Thr Thr Thr Thr Thr Ser Ala Gly Ala Arg Gly Arg Gly Gln Phe  
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Asp Arg Tyr Tyr His Glu Glu Leu Glu Ser Ala Leu Arg Glu Ala  
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Ser Val Glu Gly Arg Pro Leu Trp Val Leu Arg Leu Thr Ala Gly Leu  
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Gly Ser Leu Ile Pro Glu Gly Asp Ala Gly Pro Asp Ala Ala Gly Pro  
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Asp Ala Ala Gly Pro Leu Leu Pro Gly Arg Pro Gln Val Lys Leu Val  
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Gly Asn Met His Gly Asp Glu Thr Val Ser Arg Gln Val Leu Ile Tyr  
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Val Arg Leu Leu Asn Thr Thr Asp Val Tyr Leu Leu Pro Ser Leu Asn  
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Pro Asp Gly Phe Glu Arg Ala Arg Glu Gly Asp Cys Gly Phe Gly Asp  
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Gly Gly Pro Ser Gly Ala Ser Gly Arg Asp Asn Ser Arg Gly Arg Asp  
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Leu Asn Arg Ser Phe Pro Asp Gln Phe Ser Thr Gly Glu Pro Pro Ala  
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Leu Asp Glu Val Pro Glu Val Arg Ala Leu Ile Glu Trp Ile Arg Arg  
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Asn Lys Phe Val Leu Ser Gly Asn Leu His Gly Gly Ser Val Val Ala  
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Ser Tyr Pro Phe Asp Asp Ser Pro Glu His Lys Ala Thr Gly Ile Tyr  
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Ser Lys Thr Ser Asp Asp Glu Val Phe Lys Tyr Leu Ala Lys Ala Tyr  
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Ala Ser Asn His Pro Ile Met Lys Thr Gly Glu Pro His Cys Pro Gly  
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Asp Glu Asp Glu Thr Phe Lys Asp Gly Ile Thr Asn Gly Ala His Trp  
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Tyr Asp Val Glu Gly Gly Met Gln Asp Tyr Asn Tyr Val Trp Ala Asn  
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Cys Phe Glu Ile Thr Leu Glu Leu Ser Cys Cys Lys Tyr Pro Pro Ala  
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Ser Gln Leu Arg Gln Glu Trp Glu Asn Asn Arg Glu Ser Leu Ile Thr  
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Leu Ile Glu Lys Val His Ile Gly Val Lys Gly Phe Val Lys Asp Ser  
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Ile Thr Gly Ser Gly Leu Glu Asn Ala Thr Ile Ser Val Ala Gly Ile  
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Asn His Asn Ile Thr Thr Gly Arg Phe Gly Asp Phe Tyr Arg Leu Leu  
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Val Pro Gly Thr Tyr Asn Leu Thr Val Val Leu Thr Gly Tyr Met Pro  
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Asp Phe Ser Leu Arg Pro Thr Val Thr Ser Val Ile Pro Asp Thr Thr  
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Glu Ala Val Ser Thr Ala Ser Thr Val Ala Ile Pro Asn Ile Leu Ser  
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805 810 815

Gly Ile Leu Asn Ala Thr Ile Ser Val Ala Glu Ile Asn His Pro Val  
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Thr Thr Tyr Lys Thr Gly Asp Tyr Trp Arg Leu Leu Val Pro Gly Thr  
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Tyr Lys Ile Thr Ala Ser Ala Arg Gly Tyr Asn Pro Val Thr Lys Asn  
850 855 860

Val Thr Val Lys Ser Glu Gly Ala Ile Gln Val Asn Phe Thr Leu Val  
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885 890 895

Ser Ser Ser Thr Asn Asp Ala Ser Asp Pro Thr Thr Lys Glu Phe Glu

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905

910

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Tyr Lys Asp Leu Ser Glu Phe Leu Arg Gly Leu Val Met Asn Tyr Pro  
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His Ile Thr Asn Leu Thr Asn Leu Gly Gln Ser Thr Glu Tyr Arg His  
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Ile Trp Ser Leu Glu Ile Ser Asn Lys Pro Asn Val Ser Glu Pro Glu  
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Glu Pro Lys Ile Arg Phe Val Ala Gly Ile His Gly Asn Ala Pro Val  
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Pro Tyr Asp Lys Pro Val Gln Thr Val Glu Asn Lys Glu Thr Leu  
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Met Lys Asp Tyr Ser Val Thr Tyr Gly His Cys Pro Glu Ile Thr  
1175 1180 1185

Val Tyr Thr Ser Cys Cys Tyr Phe Pro Ser Ala Ala Arg Leu Pro  
1190 1195 1200

Ser Leu Trp Ala Asp Asn Lys Arg Ser Leu Leu Ser Met Leu Val  
1205 1210 1215

Glu Val His Lys Gly Val His Gly Phe Val Lys Asp Lys Thr Gly  
1220 1225 1230

Lys Pro Ile Ser Lys Ala Val Ile Val Leu Asn Glu Gly Ile Lys  
1235 1240 1245

Val Gln Thr Lys Glu Gly Gly Tyr Phe His Val Leu Leu Ala Pro  
1250 1255 1260

Gly Val His Asn Ile Ile Ala Ile Ala Asp Gly Tyr Gln Gln Gln  
1265 1270 1275

His Ser Gln Val Phe Val His His Asp Ala Ala Ser Ser Val Val  
1280 1285 1290

Ile Val Phe Asp Thr Asp Asn Arg Ile Phe Gly Leu Pro Arg Glu  
1295 1300 1305

Leu Val Val Thr Val Ser Gly Ala Thr Met Ser Ala Leu Ile Leu  
1310 1315 1320

Thr Ala Cys Ile Ile Trp Cys Ile Cys Ser Ile Lys Ser Asn Arg  
1325 1330 1335



His Lys Asp Gly Phe His Arg Leu Arg Gln His His Asp Glu Tyr  
1340 1345 1350

Glu Asp Glu Ile Arg Met Met Ser Thr Gly Ser Lys Lys Ser Leu  
1355 1360 1365

Leu Ser His Glu Phe Gln Asp Glu Thr Asp Thr Glu Glu Glu Thr  
1370 1375 1380

Leu Tyr Ser Ser Lys His  
1385